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Filed : March 31, 2004

REMARKS

Claims 1-58 were pending prior to entry of the amendments herein. Claims 1-30 and 45-58 are withdrawn. Claims 31, 35, 36, and 39 are amended herein.

Rejections Under 35 U.S.C. §112

Claims 35 and 36 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 35 and 36 have now been amended to overcome the §112 rejections.

Rejections Under 35 U.S.C. §102

Claims 31 and 32 are rejected under 35 U.S.C. §102(b) as being anticipated by Nagahara et al., U.S. Patent No. 5,931,719 ("Nagahara '719"). Claims 31 and 32 are also rejected under 35 U.S.C. §102(b) as being anticipated by Nagahara et al., U.S. Patent No. 5,816,900 ("Nagahara '900"). Independent Claim 31 has been amended to recite an electrode in contact with the process solution, wherein the electrode is configured to apply a potential difference between the conductive face of the wafer and the electrode. This amendment is fully supported by the specification, as originally filed, at for example, paragraphs [0011], [0012], and [0017].

Neither Nagahara '719 nor Nagahara '900 discloses or teaches a system for *electrochemical* mechanical processing comprising an electrode configured to apply a potential difference between the electrode and the conductive face of the wafer, as recited in amended Claim 31. Both Nagahara '719 and Nagahara '900 disclose a chemical mechanical polishing (CMP) system, *not* a system for electrochemical mechanical processing comprising an electrode. Amended Claim 31 is therefore patentable as it is not anticipated by either Nagahara '719 or Nagahara '900. Claim 32, which depends from and includes all of the limitations of amended Claim 31, is also patentable over Nagahara '719 and Nagahara '900. Furthermore, Claim 32 recites further distinguishing features of particular utility.

Rejections Under 35 U.S.C. §103

Claims 33 and 34 are rejected under 35 U.S.C. §103(a) as being unpatentable over either Nagahara '719 or Nagahara '900 and in view of Landau, U.S. Patent No. 6,261,433. Claims 35

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and 36 are rejected under 35 U.S.C. §103(a) as being unpatentable over either Nagahara '719 or Nagahara '900. Claims 37 and 38 are rejected under 35 U.S.C. §103(a) as being unpatentable over either Nagahara '719 or Nagahara '900 and in view of Liu et al., U.S. Patent No. 6,004,880. Claims 39 and 40 are rejected under 35 U.S.C. §103(a) as being unpatentable over Oliver, U.S. Patent No. 5,876,271, in view of Maget, U.S. Patent No. 4,522,698. Claims 41 and 42 are rejected under 35 U.S.C. §103(a) as being unpatentable over Oliver in view of Maget and further in view of Landau. Claims 43 and 44 are rejected under 35 U.S.C. §103(a) as being unpatentable over Oliver in view of Maget and further in view of Liu et al.

Independent Claims 31 and 39 have been amended to recite an electrode touching the process solution, wherein the electrode is configured to apply a potential difference between the electrode and the conductive face of the wafer, and independent Claim 39 has been amended to recite that the pad is configured such that as the pressure of the process solution increases extendable side walls of the process chamber push the polishing surface against the conductive face and apply uniform pressure on the conductive face. This amendment is fully supported by the specification, as originally filed, at for example, paragraphs [0011], [0012], and [0017].

As discussed above, neither Nagahara '719 nor Nagahara '900 discloses or teaches a system for electrochemical mechanical processing comprising an electrode configured to apply a potential difference between the electrode and the conductive face of the wafer, as recited in amended independent Claims 31 and 39. Landau discloses an electroplating or electrochemical deposition apparatus, but does not teach or suggest a system for electrochemical *mechanical* processing. As Landau discloses a *deposition or plating* apparatus, Landau does not provide any suggestion or motivation for a *pad* having a *polishing* surface and fluid openings, as recited in Claims 31 and 39. Landau does not give any motive to modify either Nagahara '719 or Nagahara '900.

Liu et al. disclose an apparatus for electrochemical mechanical polishing, but do not teach or suggest a compressible and flexible pad configured to bow and apply more pressure near the center of the conductive face than the rest of the conductive face than the rest of the conductive face as the pressure of the process solution in the solution chamber increases, as recited in Claim 31. Similarly, Liu et al. do not teach or suggest a compressible pad configured such that as the pressure of the process solution increases extendable side walls of the process chamber push the polishing surface against the conductive face and apply uniform pressure on the conductive face,

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as recited in amended Claim 39. Applicants respectfully submit that there is no teaching or suggestion in Liu et al. to alter the pressure of the process solution to bow or apply more pressure to the pad for better uniformity. The inventors of the current application have recognized that the application of more pressure in the center of the wafer compensates for the slower velocity at the center of the rotating wafer (compared to outer regions). However, there is no recognition in Liu et al. of the correlation among lack of uniformity, pressure, and the different velocities of different portions of the wafer. Thus, Liu et al. provides no motivation or suggestion for altering the pressure of the process solution to bow or apply more pressure to the pad, as recited in amended Claims 31 and 39. Liu gives no motive to alter either Nagahara '719 or Nagahara '900.

Neither Maget nor Oliver teaches or suggest a system for electrochemical mechanical processing of a conductive face of a wafer comprising a solution chamber, a compressible pad, and an electrode, as recited in Claim 39. Maget discloses a motor and does not teach or suggest electrochemical mechanical processing of a conductive face of a wafer. Oliver teaches CMP, but does not teach *electrochemical* mechanical processing. Oliver therefore not disclose any electrode nor does Oliver provide any teaching or suggestion for *electrochemical* mechanical processing using an electrode. Neither Maget not Oliver teaches or suggests *electrochemical* mechanical processing. As discussed above, Landau teaches electroplating, but does not teach or suggest electrochemical *mechanical* processing. Also as discussed above, Liu et al. disclose an apparatus for electrochemical mechanical polishing, but do not teach or suggest a compressible pad configured such that as the pressure of the process solution increases extendable side walls of the process chamber push the polishing surface against the conductive face and apply uniform pressure on the conductive face, as recited in Claim 39. There is no motivation in any of the cited references to combine the references.

Independent Claims 31 and 39, as amended, are therefore patentable over the cited references, either alone or in combination. Claims 32-38 and 40-44, which depend from and include all of the limitations of Claim 31 or Claim 39, are therefore patentable over the cited references. Furthermore, each of the dependent claims recites further distinguishing features of particular utility.

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Conclusion

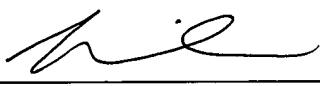
Applicants respectfully submit that all of the pending claims are patentably distinguishable and allowable over the prior art of record. The cited references, either alone or in combination, do not teach or suggest the claimed invention.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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